Port Interface Card
Installation and Safety Guide

AT-AR020 PRI E1/T1
AT-AR021 (S) BRI-S/T
AT-AR021 (U) BRI-U
AT-AR022 ETH
AT-AR023 SYN
AT-AR024 ASYN4
AT-AR026 4ETH
AT-AR027 VoIP-FXS

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Download the complete document set from
www.alliedtelesis.com/support/software

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Port Interface Card Installation and Safety Guide
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About this Guide

Port Interface Cards (PICs) are a cost effective and flexible mechanism for adding new or additional network interfaces to your switch or router.

This Installation and Safety Guide describes how to install the following PICs:

- AT-AR020 PRI E1/T1, a single ISDN Primary Rate E1/T1 interface
- AT-AR021(S) BRI-S/T, a single ISDN Basic Rate S/T interface
- AT-AR021(U) BRI-U, a single ISDN Basic Rate U interface
- AT-AR022 ETH, a dual Ethernet 10BASE-T/AUI port
- AT-AR023 SYN, a single 2Mbps synchronous interface
- AT-AR024 ASYN4, four asynchronous ports
- AT-AR026 4ETH, four Ethernet 10BASE-T ports
- AT-AR027 VoIP-FXS, two Foreign Exchange Voice over IP ports

You can download the complete documentation for Port Interface Cards from www.alliedtelesis.com/support/software. For more information about the documentation and other resources, see "Obtaining Documentation and Resources" on page 11.

Compatible Switches and Routers

You can install a PIC into a PIC bay on the base unit of your switch or router, or into a PIC bay on an AT-AR040 NSM (*Network Service Module*) installed in your switch or router.

The following table shows which PICs are appropriate for different expansion bays and models of switch and router.

This expansion bay ...	Accepts ...
PIC bays in the AR415S, AR440S, AR441S, AR442S, AR725, and AR745 router	All PICs.
PIC bays in the AR750S, AR750S-DP, and AR770S router	AT-AR020, AT-AR021, AT-AR023, and AT-AR024.
AT-AR040 NSM in the AR745 router, Rapier 16fi and Rapier 24i switch	All PICs except AT-AR022 and AT-AR026.
AT-AR040 NSM in the Rapier 48w switch	AT-AR020, AT-AR021, and AT-AR024.

The AT-AR021(S) V3 hardware revision, identified by the label "AR021v3" on the board, requires a switch or router running AlliedWare® Operating System version 2.9.1-13 or later.

Package Contents

The following items are included with each Port Interface Card (PIC). Contact your authorised Allied Telesis distributor or reseller if any items are damaged or missing.

■ two spring-loaded retaining thumbscrews

■ two jumpers (AT-AR020 PRI E1/TI and AT-AR021(S) BRI-S/T only).

■ this Installation and Safety Guide

■ one warranty card

Choosing a PIC Bay

Observe the following guidelines when selecting a PIC bay:

■ Use the PIC bays on the switch or router base unit first, before installing PICs into an AT-AR040 NSM.

■ Fill the PIC bays in an AT-AR040 NSM starting at bay 0.

■ You can install a maximum of two AT-AR020 PRI E1/T1 PICs into an AT-AR040 NSM, and maximum of four total in a switch or router.

■ If two AT-AR020 PICs are installed in an AT-AR040 NSM, PIC one must be installed in the lower row (bay 0 or 1) and the other PIC must be installed in the upper row (bay 2 or 3).

■ If an AT-AR020 PIC is installed in an AT-AR040 NSM, and operating in E1 mode, you can not install an AT-AR021(S) or AT-AR021(U) PIC in the same row of the NSM.

■ You can install a maximum of four AT-AR027 PICs in an AR745 router fitted with an AT-AR040 NSM.

■ Avoid installing an AT-AR022 or AT-AR026 PIC in an AT-AR040 NSM. Performance of these interfaces may be reduced and packet loss may occur.

For instructions on installing an AT-AR040 NSM into your switch or router, see the *Network Service Module Installation and Safety Guide* supplied with the NSM. You can also download this document from www.alliedtelesis.com/support/software.

Installing a PIC

This section describes the procedure for installing a PIC. You should also follow this procedure, in particular the safety procedures and warnings, when replacing or removing a PIC.

⚠ **Caution** You cannot install PICs into an AT-AR040 NSM that has power applied to it. This includes NSMs that have been deactivated using the hot swap button, but not physically removed from the switch or router. To ensure that all power is removed from the NSM bay, you must either physically remove it from the switch or router using the hot swap method, or disconnect all power sources to the switch or router.

1. Read the safety information.

For safety information, see the Installation and Safety Guide shipped with your switch or router. You can also download the complete documentation for your switch or router from www.alliedtelesis.com/support/software/.

2. Gather the tools and equipment you will need.

A medium-sized flat-bladed screwdriver may be useful when loosening the PIC thumbscrews. You should also have any cables required for connecting the PIC to a wide area network or other network devices.

3. Remove power to the switch or router.

⚠ **Warning** Do not install a PIC into an NSM bay or PIC bay base unit without first removing power from the switch or router. Be sure to disconnect both the main power supply and any attached redundant power supply. Installing a PIC with the switch or router powered ON can damage the PIC, NSM and base unit.

4. Remove all TNV connections to existing PICs.

⚠ **Warning** Remove any cables attached to the external WAN ports of the AT-AR020, AT-AR021 and AT-AR027 PICs, as these supply TNV into the switch or router. Dangerous voltages may be present on some parts of the board, even if the switch or router is powered OFF.

5. Install the AT-AR040 NSM if required.

Use the installation instructions in the *Network Service Module Installation and Safety Guide* to install an AT-AR040 NSM.

6. Remove the PIC bay faceplate, NSM PIC bay faceplate, or existing PIC.

Loosen the thumbscrews to remove the faceplate or PIC. Keep the faceplate for future use. If you remove the PIC, replace the faceplate to prevent dust and debris from entering the switch or router and to maintain proper airflow.

7. Unpack the PIC.

In an antistatic environment, remove the PIC from its packing material. Be sure to observe ESD precautions.

⚠ **Warning** Do not attempt to install a PIC or any other expansion option without observing correct antistatic procedures. Failure to do so may damage the switch or router, PIC, or expansion option. If you are unsure what the correct procedures are, contact your authorised Allied Telesis distributor or reseller.

8. If the PIC has jumpers, check they are correctly set.

⚠ **Warning** Do not attempt to change any jumpers, DIP switches, or other hardware configurations while the switch or router is connected to a power supply, redundant power supply, or a 'live' network. Dangerous voltages may be present on some parts of the board, even if the switch or router is turned off.

AT-AR020 PRI E1/T1 and AT-AR021(S) BRI-S/T PICs have user-configurable jumpers. Check all jumpers are set correctly on the new PIC, as shown in Table 1 and Table 2. Early versions of the AT-AR020 PIC also have a J3 interface jumper. If present, this jumper must be installed for E1 mode and removed for T1 mode. The AT-AR021(S) V2 hardware revision, identified by the label "AR021 V2" on the board, supports both TE and NT mode. Jumper J4, when installed, selects NT mode. The PIC should be configured as a TE for normal operation.

Table 1: Functions of jumpers on the AT-AR020 PRI E1/T1 PIC board

Jumper	Function	Default
J1	ISDN NT mode (installed, test only) or TE mode (not installed).	Not installed.
J2	T1 mode (installed) or E1 mode (not installed).	Installed.
J3	E1 mode (installed) or T1 mode (not installed). Only present on earlier versions of the PIC.	-

Table 2: Functions of jumpers on the AT-AR021(S) BRI S/T PIC board

Jumper	Function	Default
J1	100Ω termination for TX.	Not installed.
J2	100Ω termination for RX.	Not installed.
J4	ISDN NT mode (installed) or TE mode (not installed). Only present on V2 hardware revision of PIC.	Not installed.

AT-AR026 4ETH PICs have user-configurable links that set features such as auto-negotiation, buffer size, and MAC address aging. For a detailed description of the links, see the *Port Interface Card Hardware Reference*.

For more information on PIC jumpers and hardware configurations, see the *Port Interface Card Hardware Reference*. This document can be downloaded from www.alliedtelesis.com/support/software/.

9. Slide the PIC into place.

    PIC bays should be filled in numerical order, starting with the lowest available bay (e.g., bay 0) followed by bays with progressively higher numbers.

    Insert the PIC slowly, being sure to keep it straight. Press firmly until you feel the connector engage. Do not force a misaligned PIC.

10. Secure the PIC by tightening its thumbscrews.

11. Apply power to the switch or router.

    Re-attach the power cord, and reconnect any redundant power supply.

12. Test the PIC.

    There are several ways to check the PIC is installed and functioning correctly.

    The **show system** command displays general system information about PICs and any other hardware installed, as well as memory, software version and patches loaded on the switch or router.

    If the PIC does not appear in the list of boards at the top of the **show system** output, then your switch or router has not recognised the PIC. Likely reasons are:

    • Your switch or router does not support the PIC. See "Compatible Switches and Routers" on page 3.

    • Your switch or router is running a version of the AlliedWare® Operating System that does not support the PIC. Use the **show system** command to check the software version. In particular, the AT-AR021(S) V3 hardware revision requires a switch or router running AlliedWare® Operating System version 2.9.1-13 or later.

    • The PIC is not installed correctly. Repeat the installation process, paying particular attention to step 9.

    For more detailed information on testing PICs, see the *Port Interface Card Hardware Reference*. You can download this document from www.alliedtelesis.com/support/software/.

Setting the ISDN Territory

Before you connect an AT-AR020 or AT-AR021 PIC to the ISDN network, check that the ISDN territory is set correctly for your region.

1.   Log in to your switch or router.

For more information, see the Installation and Safety Guide included with your switch or router. You can also download the complete documentation for your switch or router from www.alliedtelesis.com/support/software/.

2.   Set the territory, using the command:

```
set system territory={australia|china|europe|japan|korea|
    newzealand|usa}
```

In Australia only:

- To use the Micro service, set the territory to **australia**.

- To use the OnRamp service, set the territory to **europe**.

3.   Save the configuration.

Save your configuration to a new file by using the command:

```
create config=filename.cfg
```

Then set the router to load this file when it restarts by using the command:

```
set config=filename.cfg
```

We recommend leaving the boot.cfg file unchanged, in case you need to revert to the original default configuration.

See the *AlliedWare® Operating System Software Reference* for more information on configuring ISDN.

Downloading VoIP Firmware

If you have installed an AT-AR027 VoIP PIC, you now need to download and install the VoIP firmware onto your PIC. Before you begin, check that the PIC Error LED on the PIC is **off**, and that the PIC has been recognised by your switch or router, using the **show system** command.

1. Download the VoIP PIC firmware.

    Point your web browser at www.alliedtelesis.com/support/software/. Navigate to the PIC product information page and find the firmware files you need from the support page. You will need:

    • the PIC boot code, which is responsible for loading the protocol image onto the PIC

    • the images for the protocols you wish to run on the PIC—SIP and/or H.323

    Download the firmware files you need and save them to your TFTP server.

2. Load the boot code onto your switch or router.

    To load the boot code from your TFTP server, use the command:

    ```
    load method=tftp destination=flash server={hostname|ipadd}
        file=filename
    ```

3. If possible, load the protocol image onto your switch or router.

    If you have enough space, load the protocol image onto your switch or router's flash, so that it does not need to be continually connected to an external TFTP server. Use the load command as described above.

4. Set the boot code and protocol image.

    To set the boot code on the switch or router, use the command:

    ```
    set voip bootcode=filename server={ipadd|flash}
    ```

    This command sets the boot code filename, and specifies the location of the protocol image that the boot code will load.

    To set the name of the protocol image (file), and specify what type of VoIP protocol the protocol image supports, use the command:

    ```
    set voip file=filename protocol={h323|sip} type={fxs|fxo}
    ```

5. Set the interface for the VoIP traffic.

    To set the preferred interface for VoIP traffic, use the command:

    ```
    set voip public interface=interface
    ```

    If a logical interface is not specified, 0 is assumed (that is, eth0 is equivalent to eth0-0).

6. Load the protocol image onto the PIC.

To load the protocol image, use the command:

```
enable voip protocol={h323|sip} [engine={engine}]
```

The boot code loads the protocol onto all AT-AR027 PICs unless you specify an individual PIC (engine). The engine name is formed by concatenating a VoIP interface type and an engine instance (for example, fxs2). A fully qualified engine name may also be specified (for example, bay0.fxs0 or nsm0.bay1.fxs0).

Once the firmware is loaded, all the LEDs turn off. The following figure shows an example of the firmware download process. User input is shown in **bold**.

```
Manager> set voip boot=c-1-0-0.bin server=10.32.16.115
Info (1110003): Operation successful.
Manager> set voip fi=hs-1-0-0.bin protocol=h323
Info (1110003): Operation successful.
Manager> set voip public int=eth0
Info (1110003): Operation successful.
Manager> ena voip protocol=h323
Info (1110282): VoIP PIC BAY0:Firmware is loading...
Info (1110282): VoIP PIC BAY1:Firmware is loading...
Manager>
Info (1110293): VoIP PIC BAY0:Firmware successfully loaded.
Manager>
Info (1110293): VoIP PIC BAY0:Firmware is now running.
Manager>
Info (1110293): VoIP PIC BAY1:Firmware successfully loaded.
Manager>
Info (1110293): VoIP PIC BAY1:Firmware is now running.
```

7. Save the configuration.

Save your configuration to a new file by using the command:

```
create config=filename.cfg
```

Then set the router to load this file when it restarts by using the command:

```
set config=filename.cfg
```

We recommend leaving the boot.cfg file unchanged, in case you need to revert to the original default configuration.

Obtaining Documentation and Resources

For more information, see:

■ the Installation and Safety Guide for your switch or router

■ the *Port Interface Card Hardware Reference*, which contains detailed information on PICs and their hardware features

■ the *Network Service Module Installation and Safety Guide*, which describes how to install NSMs including the AT-AR040

■ the *Network Service Module Hardware Reference*, which contains detailed information on NSMs and their hardware features

■ the *AlliedWare® Operating System Software Reference*, which contains detailed information on configuring PICs

You can download these documents and updates from www.alliedtelesis.com/support/software.

You need Adobe® Acrobat® Reader® software to view, search, or print these documents. You can download it from www.adobe.com.

Other resources

How-To Notes describe a range of standard Allied Telesis solutions, and include technical tips and guides to configuring specific hardware and software features. You can download the latest How-To Notes from www.alliedtelesis.com/resources/literature/howto.aspx.

MIBs supported by Allied Telesis products can be downloaded from www.alliedtelesis.com/support/software.

Microsoft® Visio® stencils for Allied Telesis products can be downloaded from www.alliedtelesis.com/resources/images/visio.aspx.

AT-TFTP Server for Windows is a TFTP (*Trivial File Transfer Protocol*) server for transferring software versions, configuration scripts and other files between a PC and a switch or router. You download AT-TFTP Server from www.alliedtelesis.com/support/software.

Contacting us

With locations covering all of the established markets in North America, Latin America, Europe, Asia, and the Pacific, Allied Telesis provides localized sales and technical support worldwide. To find the representative nearest you, visit us on the Web at www.alliedtelesis.com.

Telecommunications Interfaces

⚠ **Warning** To reduce risk of fire, use only No.26 awg (0.4 mm) or larger telecommunications line cord if the cord supplied is not used with the apparatus.

Important Safety Instructions

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Do not use this product near water, for example near a bathtub, washbowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.

2. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

3. Do not use the telephone to report a gas leak while in the vicinity of the leak.

4. Use only the power cord and batteries indicated in this manual. Do not dispose of batteries in a fire; they may explode. Check with local codes for possible special disposal instructions.

5. Remove the telephone cord from the unit prior to making changes to the expansion port.

Save these instructions